JACOBS ENGINEERING GROUP INC.

10901 WEST 84th TERRACE, SUITE 210, LENEXA, KANSAS 66214
TELEPHONE (913) 492-9218 • FAX (913) 492-6198

April 4, 1991

Ms. Pauletta France-Isetts
Remedial Project Manager
U.S. Environmental Protection Agency
Region VII - Superfund Branch
726 Minnesota Avenue
Kansas City, Kansas 66101

Re: Missouri Electric Works Facility
Trip Report
EPA Work Assignment No. 43-7W6R
Jacobs Project No. 10-D243-01

Dear Ms. France-Isetts:

Enclosed for your review and approval are the original and one copy of the Trip Report for the monitoring well installation and groundwater sampling at the Missouri Electric Works Facility conducted from January 28 through March 1, 1991.

Please contact me at (913) 492-9218 should you have any questions.

Sincerely,

Terence D. Hagen
Site Manger

TDH/sdt

Enclosures

JACOBS ENGINEERING GROUP INC.

ALTERNATIVE REMEDIAL CONTRACTS STRATEGY

REGIONS VI, VII & VIII

REMEDIAL PLANNING ACTIVITIES

AT

SELECTED UNCONTROLLED HAZARDOUS

SUBSTANCE DISPOSAL SITES

U.S. EPA CONTRACT NO. 68-W8-0122

IN ASSOCIATION WITH,

TERRACON CONSULTANTS EC, INC.

McCLELLAND ENGINEERS, INC.

ENVIRONMENTAL PROTECTION AGENCY

ALTERNATIVE REMEDIAL CONTRACTS STRATEGY
REGIONS VI, VII, VIII

U.S. EPA CONTRACT NO. 68-W8-0122
WORK ASSIGNMENT NO. 43-7W6R

TRIP REPORT
FOR

JANUARY 28, 1991 TO MARCH 1, 1991
MISSOURI ELECTRIC WORKS FACILITY
CAPE GIRARDEAU, MISSOURI

CERCLA ENFORCEMENT SUPPORT ACTIVITIES
U.S. EPA REGION VII

JACOBS ENGINEERING GROUP INC.
10901 WEST 84TH TERRACE, SUITE 210
LENEXA, KANSAS 66214
(913) 492-9218
PROJECT NUMBER 10-D243-00

MARCH 1991

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MISSOURI ELECTRIC WORKS FACILITY
CAPE GIRARDEAU, MISSOURI

1.0 INTRODUCTION

From January 28, 1991 through March 1, 1991, three U.S. Environmental Protection Agency (EPA) representatives under the ARCS contract, Mr. Todd Trometer, Mr. Terry Hagen, and Mr. Paul Kieler of Jacobs Engineering Group Inc. were present on behalf of the PRP Steering Committee at the Missouri Electric Works Facility (MEW) located in Cape Girardeau, Missouri (Figure 1). The purpose of the visit was threefold: 1) to provide oversight of and document activities performed by John Mathes and Associates, Inc. (Mathes), The Earth Technology Corporation (TETC), and PRP consultant personnel; 2) to collect split samples of groundwater during monitoring well installation and after completion of the well; and 3) to gain a better insight on the geologic and hydrogeologic setting at MEW. Mathes field activities included drilling of all boreholes and the construction of the deep monitoring well (MW-11) located in the immediate vicinity of MW-3 and MW-5. The Earth Technology Corporation field activities included groundwater sampling, collecting water quality parameters on the groundwater sampling, measuring groundwater level elevations, performing packer tests, supervising and logging all drilling activities, and supervising monitoring well installation.

2.0 SUMMARY OF ACTIVITIES OVERSEEN BY EPA ARCS REPRESENTATIVES

2.1 Monitoring Well Construction

The monitoring well, (MW-11), was constructed by John Mathes and Associates, Inc. under the direct supervision of TETC personnel. The location of this monitoring well is depicted in Figure 1. A total of four boreholes were drilled in an attempt to install a monitoring well to a depth of 180 feet. The initial borehole was drilled to a depth of 142 feet, with continuous rock coring from 60-142 feet. This borehole was abandoned after the core barrel became lodged in the borehole and could not be removed. Two other boreholes were also initiated and later were abandoned due to complications encountered during drilling. A monitoring well was finally installed at the fourth borehole location. A CME-95 drilling rig equipped with hollow stem auger, rock corer with NX diamond-impregnated core barrel, and an air compressor for air coring was used in the operation. A VAN AIR CX series coalesing filter was used to remove hydrocarbons and volatiles in the compressed air line. Drill cuttings were shoveled to the side of the drill rig.

At the first borehole, the hollow stem auger was advanced through the weathered/fractured bedrock to the top of the competent bedrock located at approximately 60 feet. The hollow stem auger and drilling rods (which were advancing the center plug) were then pulled and casing was set. A six-inch inner diameter (I.D.) schedule 80 threaded steel casing in 10-foot sections was used to seal off the boring walls. The casing was thoroughly decontaminated with a steam cleaner before it was installed in the borehole. The borehole was grouted once the casing was in place, then left to set up overnight. The curing period for this grout was from 1405 on January 29 to 1400 on January 30, 1991. The grout mixture consisted of 75 gallons water, five ninety-four pound bags of portland type I cement, and one-half 100-hundred pound bag of bentonite. The water used in the grout mixture was from the MEW tap. Before air coring, the grout plug at the bottom of the steel casing was reamed out with a rock bit. Air coring then commenced at 1400 on January 30, 1991 at a depth of approximately 60 feet. Two air compressors were used, at different times, during air coring. The air compressors used were an Atlas Copco 100 psi/350 cfm and a Schramm 350 psi/850 cfm. At 69 feet a 4-inch I.D. steel casing was placed inside the 6-inch I.D. outer casing and driven into the formation with a 300 pound drive-hammer. This technique was utilized in order to better seal off the borehole and maintain air pressure so the borehole could be properly flushed out. Mathes personnel also started adding steam to the pressurized air line to aid in flushing out the well. At 81 feet, water was added to the borehole to help alleviate some of the stress on the coupling.

Rock cores were collected in 5-foot runs, up to 92 feet. From 92 to 99 feet, a core run of seven feet was recovered. An ten-foot core run followed from a depth of 99 feet to a depth of 109 feet.

2.2 Groundwater Sampling

Groundwater samples were collected by TETC personnel from the previously installed shallow monitoring wells constructed for the remedial investigation. Groundwater samples were collected after at least 3 casing volumes, determined by calculation, were purged out of the monitoring well. The purge water was later dumped onsite. Disposable bailers were utilized when purging each monitoring well. During purging of the monitoring wells, water quality field parameter data was collected, including temperature, pH, and specific conductance. Purge water was very turbid in most of the monitoring wells. Groundwater sampling commenced upon the completion of purging the monitoring wells, with a Teflon bailer. The Teflon bailer was decontaminated prior to groundwater sampling and between each well. All groundwater samples were placed in a cooler with ice preservative upon the completion of groundwater sampling at each monitoring well location. The shallow monitoring well groundwater samples were collected for volatile and semivolatile organics and were to be analyzed by APR Laboratories of Houston, Texas.

2.3 Groundwater Split Sampling

Groundwater split samples were obtained by 3 different ARCS representatives at the same time the TETC personnel collected groundwater samples from the monitoring well (MW-11) or borehole #1. The three ARCS representatives with corresponding split sample information are listed below:

Name	Bore # or Well	# of Split Samples	Depth of Split Sample	Sample#	Date	Preservative
Todd Trometer (Oversight manager)	Borehole #1	1 PCB 1 VOA	81 feet	CS26R-001	2/3/92	ice
Terry Hagen (Project Manager)	Borehole #1	1 PCB 1 VOA	124 feet	CS26R-002	2/5/91	ice
Paul Kieler (Oversight Manager)	Borehole #4 (MW-11)	1 PCB 1 VOA	122 feet	CS36R-001	3/1/91	ice

Trip blanks were taken at the first borehole locations; their sample numbers were CS26R-005F and CS26R-006F.

3.0 DEVIATIONS FROM THE WORK PLAN

Deviations from the stated work plan dated January 25, 1991 are listed below:

- Due to the complications associated with air coring through the competent limestone layer, four boreholes, instead of one, were drilled in order to install MW-11.
- Mud seams encountered in the competent limestone layer caused complications in air coring through the bedrock. This problem resulted in the determination of setting MW-11 at 122 feet instead of the 180 feet stated in the work plan.
- Complications in air coring with the diamond-impregnated bit, without the use of water, led to increased friction between the bit and the bedrock surface creating stress on the drill rods. Subsequently, a number of couplings cracked during the first borehole. A decision was later reached to add steam to the pressurized air line. Later, water was also added to help alleviate this problem.

Water added to the boreholes came from two different sources, the MEW tap and the Union Electric Waterworks. By using water during air coring, friction created from the diamond-impregnated core barrel bit was reduced. Water samples from both water sources were collected by TETC personnel and forwarded to APR Laboratories for analysis. By sampling both water sources, problems associated with cross-contamination could be addressed.

4.0 SUMMARY OF DAILY ACTIVITIES

4.1 January 28, 1991

The ARCS representative, Mr. Trometer, arrived at MEW in Cape Girardeau, Missouri at 1420. At 1520 Mr. Trometer met with Eddie Stanaland and David Boylan (TETC), Jeff Crank and Jim Breeding (Mathes). Bill Gresham of Jacobs Engineering Group, Inc. was also present. Drillers proceeded to set up the drilling rig over the boring location and constructed a decontamination station directly in back (east) of MEW, in the gravel lot. Photograph 1 shows the drill rig set-up. Decontamination of all equipment commenced shortly thereafter. Onsite personnel included:

Eddie Stanaland	TETC	Geologist
David Boylan	TETC	Hydrogeologist
Jeff Crank	Mathes	Drill Helper
Jim Breeding	Mathes	Driller
Bill Gresham	Jacobs	Geologist
Todd Trometer	Jacobs	Oversight Manager

4.2 January 29, 1991

At 0735 the ARCS representative, Mr. Trometer, met with Eddie Stanaland of TETC to confirm that the tentative groundwater sample depths were to be 80, 120, 160, and 180 feet. At 0750 Warren Mueller of Union Electric arrived onsite. Mr. Trometer conveyed to Mr. Mueller the planned activities for the day.

At 0824 the Mathes personnel began advancing the boring. At 0859 the drillers notified Mr. Trometer that drill cuttings were going to be spread out on the ground on MEW property. Photograph 2 gives a pictorial description of the drill cuttings. At 0921 competent bedrock was encountered at approximately 60 feet. The drillers tripped out of the hole once the competent bedrock surface was encountered. Hoses were then placed in the borehole and the grout mixture was pumped into the borehole. Upon completion of grouting the boring, Mathes personnel lowered steel outer casing into the borehole. Casing of the boring was completed at 1231. At 1445 ARCS representatives, Mr. Todd Trometer and Mr. Bill Gresham, met with Jim Fels and Kurt Hollman of the Missouri Department of Natural Resources to discuss field activities. At 1616 TETC personnel began taking water level measurements from all remedial investigation (RI) monitoring wells with a Solinst water level indicator. Table 1 gives the water level elevations along with the measured depth of each monitoring well. New onsite personnel included:

Warren Mueller	Union Electric	Emergency Response Coordinator
Jim Fels	MDNR	Geologist
Kurt Hollman	MDNR	Geologist

4.3 January 30, 1991

Drilling operations resumed at 1112 by punching through the grout plug at the bottom of the borehole. Air coring through the competent limestone/bedrock commenced at 1400. At 1545 a rock core from 61 to 64 feet was recovered. The rock core was thinly bedded/fractured limestone which constitutes the weathered/fractured bedrock zone (Photograph 3). The same weathered/fractured bedrock zone was present

up to approximately 69 feet. During the second coring run, David Boylan of TETC started purging MW-7 and MW-8. At 1730 Mr. Trometer left the site. New personnel included:

Stephanie Doolan	Jacobs Oversight Manager

Warren Mueller also left the site until a later date.

4.4 January 31, 1991

TETC personnel resumed purging of RI monitoring wells and continued measuring water quality field parameters. The purged water was highly turbid in most monitoring wells. Photograph 4 shows purge water from MW-10. All groundwater quality field parameters are listed in Table 2 along with the appropriate purge volumes. Samples were collected once purging was completed from the shallow RI monitoring wells at 1737. Mathes personnel began lowering 4-inch I.D. casing inside the already set 6-inch I.D. casing. Mr. Trometer left the site at 1805. New personnel onsite included:

Chuck Harris	Mathes	Driller
Terry West	PRP Rep.	Consultant to PRPs

4.5 February 1, 1991

At 0830 the 4-inch I.D. casing was driven into the competent limestone/bedrock with a 300 pound drive-hammer. At 1200 the air compressor blew a gasket. At 1446 Mathes personnel notified Mr. Trometer that a new air compressor would have to be brought down to the site to replace the broken air compressor. At 1637 Mr. Trometer left the site. Terry West, Chuck Harris, Jim Fels, and Kurt Hollman left the site until a later date.

4.6 February 2, 1991

At 0830 Kent Schaffer of Mathes arrived onsite with a new air compressor. The air compressor was a Schramm 350 psi/850 cfm unit. Mathes personnel once again had problems with breaking the coupling connected to the drill rods (Photograph 5). At 1545, the drillers tripped out of the borehole after cracking 3 couplings. At 1610 a core sample from 69 to 74 feet was collected (Photograph 6). The sample showed intermittent iron oxide staining, and fractures filled with calcite (Photograph 7). TETC personnel measured the water level in the borehole. The water level was recorded at 60.65 feet from the top of casing (with a 3-foot stick-up).

4.7 February 3, 1991

At 0820 air coring resumed at a depth of 74 feet. At 81 feet another coupling cracked. Mathes personnel notified Mr. Trometer and TETC personnel that water was going to be needed to help alleviate the stress put on the coupling. Mr. Trometer pointed out to TETC personnel that it would be a good idea to take a groundwater sample before water was added to the borehole. A core sample was pulled and the TETC personnel took a water level measurement from the borehole in order to calculate the purge volume. The recorded water level measurement was approximately 69 feet. The borehole was then purged and groundwater samples were taken. Mr. Trometer obtained split sample C526R-001 from the borehole at 1107 immediately following purging. A Teflon bailer was used for all groundwater sampling including split sampling (Photograph 8). Sampling was accomplished by alternately filling the respective PRP and EPA sample containers in the following order: VOA then PCB samples. Samples for the PRP were sent to APR Laboratories for analysis. EPA samples were forwarded to the Region VII EPA Laboratory and custody was transferred to Ms. Nicole Roblez. All samples were preserved with ice and placed into the cooler containing the split samples from the first borehole.

Upon sampling completion, Mathes personnel once again resumed air coring, this time by adding water to the borehole. At 81.5 feet to 82.5 feet, one foot of void space was encountered, which was probably a mud seam. This conclusion was based on the abundant mud cavities found in the core (Photograph 9).

At 1228 the drillers pulled out a core sample from 82.5 to 87 feet (Photograph 10). This core sample contained abundant fracturing and an apparent stylolite feature. At 1740 Mr. Trometer left the site. New personnel included:

Warren Mueller	Union Electric	Emergency Response Coordinator

4.8 February 4, 1991

Air coring operations resumed at the first borehole at 0742. At 1020 Eddie Stanaland of TETC notified Mr. Trometer that the core barrel was stuck in the borehole and the Mathes personnel would have to trip out of the borehole. After tripping out of the borehole, the Mathes personnel discovered that the main drill rod was split at the female joint. Photograph 11 shows the core sample taken up to this point, from 91 to 107 feet. At 1615 Mr. Trometer left the site. Mr. Mueller left the site to come back at a later date.

4.9 February 5, 1991

ARCS representative Terry Hagen arrived onsite at approximately 0945. Personnel onsite included Kent Schaffer, Jim Breeding and Jeff Crank, from John Mathes; and Eddie Stanaland and David Boylan of Earth Technology. The drillers had completed a 10 foot core section earlier in the morning. The core was slightly fractured limestone and appeared to be wet; however, this observation was tentative due to the use of water in the hole. The boring was at 117 feet.

Coring continued to 124 feet (1140 hours). The core was slightly fractured limestone. At this point the boring was purged for sampling using a 100 psi Ingersoll-Rand compressor. Approximately six bore volumes were purged at a rate of 2 to 3 gallons per minute. Purge water was discharged onto the ground on MEW property. Samples were then collected for PCBs and volatile organics. The EPA split sample was labelled as CS26R-002 and was immediately placed on ice to 4°C. Terry Hagen left the site at approximately 1550 to call the EPA contact for the site.

4.10 February 6 - February 27, 1991

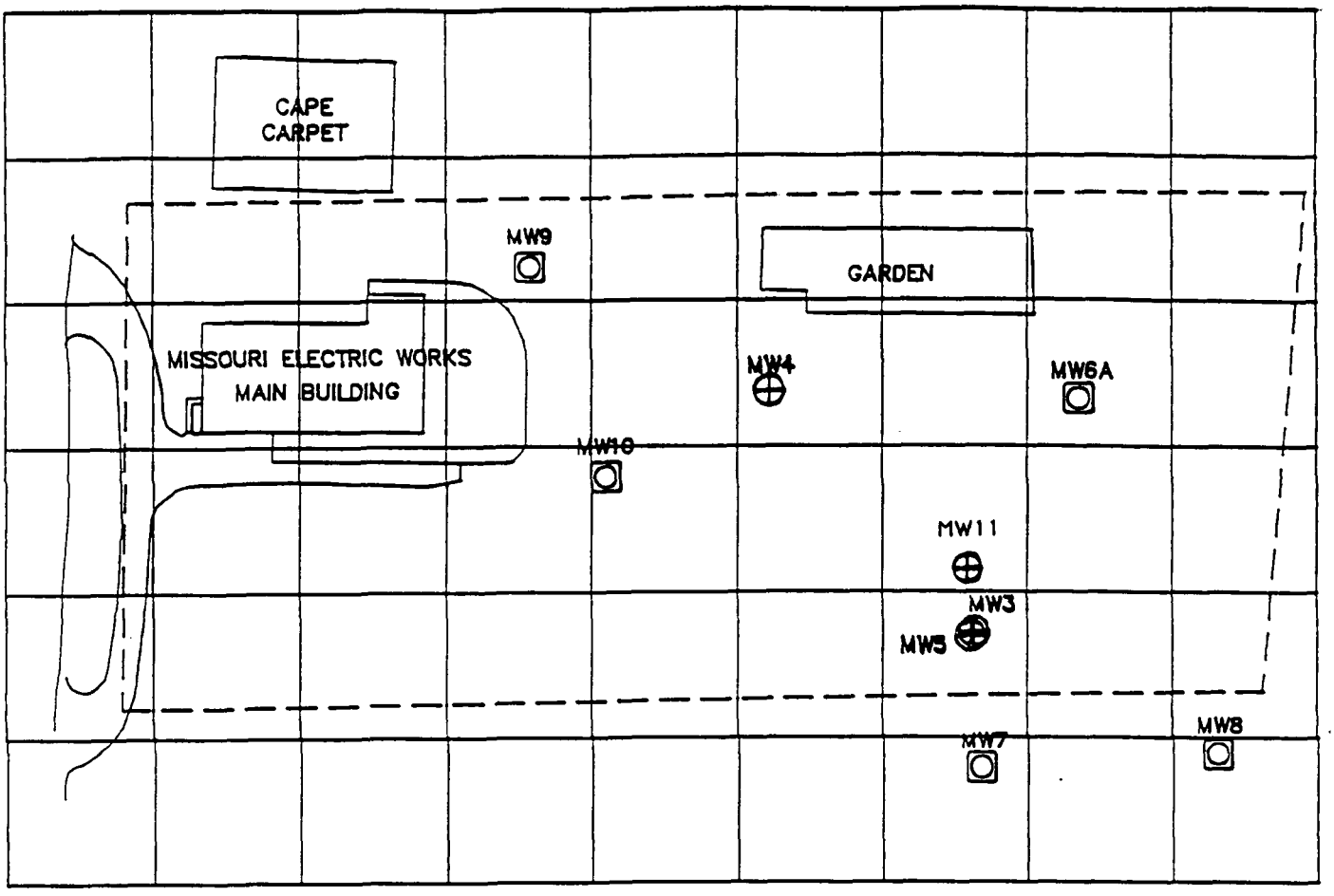
During the time period between February 6 and February 27, 1991, an ARCS representative occasionally visited the MEW site while working at another site in the area. Significant events are listed below:

- On February 6, 1991, the drill casing became stuck in the boring and eventually led to the abandonment of this boring.
- On February 21, 1991 the ARCS representative verified borehole #4's location for the installation of MW-11.
- On February 26, 1991 packer tests were run on the zone 113 to 119 feet.
- On February 27, 1991 several packer tests were run on the zones between 96 and 113 feet.
- On February 28, 1991 MW-11 was completed and developed.

4.11 March 1, 1991

At 0930, Mr. Paul Kieler of Jacobs Engineering arrived onsite. At 1000 Mr. Kieler confirmed sampling parameters with TETC personnel. Groundwater analysis parameters for samples collected from MW-11 included PCBs, VOAs, chlorinated hydrocarbons, TDS, major cations, and anions. Major cations and anions samples were also going to be collected at MW-3. At 1013 Mr. Kieler obtained split sample number CS36R-001 after the purging of MW-11 for the following parameters: VOAs and PCBs, in that order. These samples were promptly placed in a cooler with ice preservation upon completion of split sampling. At 1102 Mr. Kieler left the site to forward split samples to the EPA Region VII Laboratory.

FIGURES



MAP LEGEND

⊕ EXISTING MONITORING WELLS

PHASE III MONITORING WELLS

PROPERTY BOUNDARY

NORTH

SCALE

0 100' 200'

MEW Site File
Break6_000525

FIGURE DESCRIPTION: RI MONITORING WELLS	WORK ASSIGNMENT NO. 18-7P6R
SITE NAME: MISSOURI ELECTRIC WORKS CAPE GIRARDEAU, MO	JACOBS PROJECT NO. 10-D218-01
JE JACOBS ENGINEERING GROUP INC.	ARCS
DRAWN BY: TT DATE: 3/28/91	FIGURE NO. 1
CHECKED BY: TT DATE: 3/28/91	

TABLES

TABLE 1

WELL #	Depth To Water	Depth To Bottom	Date	Time
1	Abandoned	Abandonded	--	
2	29.18	29.50	1-29-91	1640
3	37.37	59.28	1-29-91	1630
4	39.92	59.10	1-29-91	1644
5	36.85	42.33	1-29-91	1623
6 (old)	23.41	25.23	1-29-91	1619
6a (new)	41.56	47.18	1-29-91	1634
7	23.58	32.45	1-29-91	1545
8	18.97	35.18	1-29-91	1553
9	34.79	50.41	1-29-91	1655
10	39.35	62.65	1-29-91	1658

JE4\123\TB10TT327

TABLE 2

Well #	Total Purge Volume (gallons)	pH (standard units)	Specific Conductance (millisieman/cm)	Temperature (C°)
1				
2	.16			
3	11	@2 gal - 7.05 @3 gal - 6.92 @5 gal - 6.85	4.66 4.99 4.69	12 12 12
4	9.8	@3 gal - 7.46 @6 gal - 7.28 @10 gal - 7.15	3.61 1.80 1.91	11 12 12
5	2.8	@1 gal - 7.29 @2 gal - 7.01 @3 gal - 6.96	1.94 2.16 2.13	12 13 13
6	.9	---		
7	4.5	7.23	2.86	12
8	8.3	7.20	3.21	12
9	8	@3 gal - 7.95 @5 gal - 7.90 @8 gal - 7.63	2.16 1.28 2.19	12 13 13
10	12	@5 gal - 10.3 @8 gal - 10.1 @12 gal - 8.56	3.89 4.56 1.96	10 13 13

(Specific conductance was read off of the 20 x scale)

JE4\123\TB20TT327

ATTACHMENTS

ATTACHMENT A

PHOTOGRAPHS

PHOTOGRAPH NO. 1

SITE NAME: Missouri Electric Works

Subject:	Drill rig set up over borehole #1.		
Location:	Adjacent to MW-3 and MW-5.		
Date:	1/30/91	**Time:**	1623
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 100	**Witness:**	N/A

Direction of Photograph: Northeast

PHOTOGRAPH NO. 2

SITE NAME: Missouri Electric Works

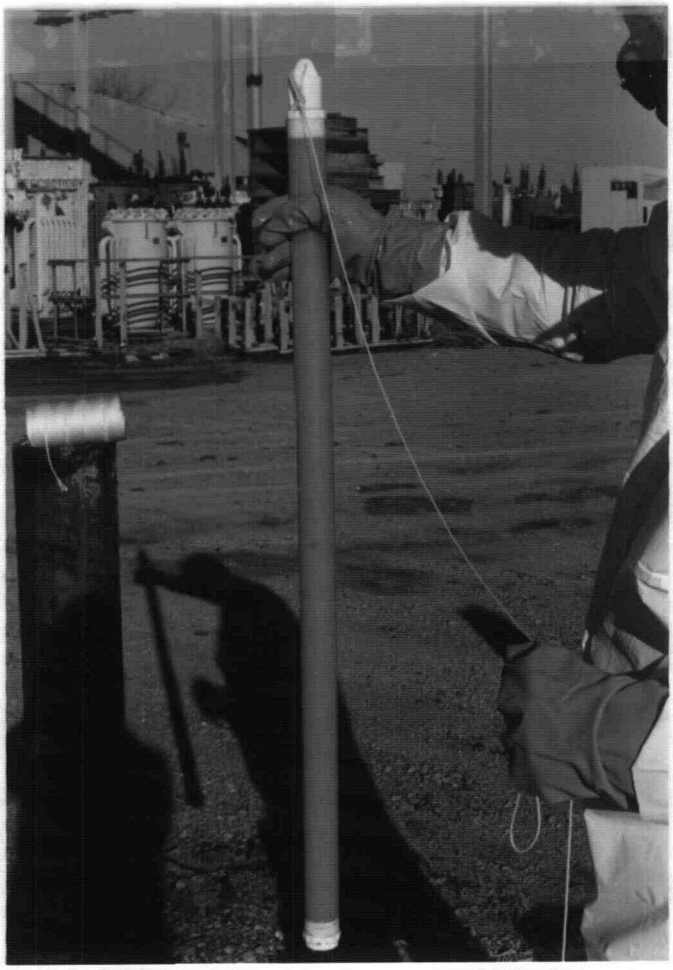
Subject:	Drill cuttings.		
Location:	Next to drill rig.		
Date:	1/29/91	Time:	0920
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 100	**Witness:**	N/A
Direction of Photograph:	West		

PHOTOGRAPH NO. 3

SITE NAME: Missouri Electric Works

Subject:	Core from 61 to 64 feet.		
Location:	Southeast of drill rig.		
Date:	1/30/91	Time:	1454
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 100	**Witness:**	N/A

Direction of Photograph: Northwest

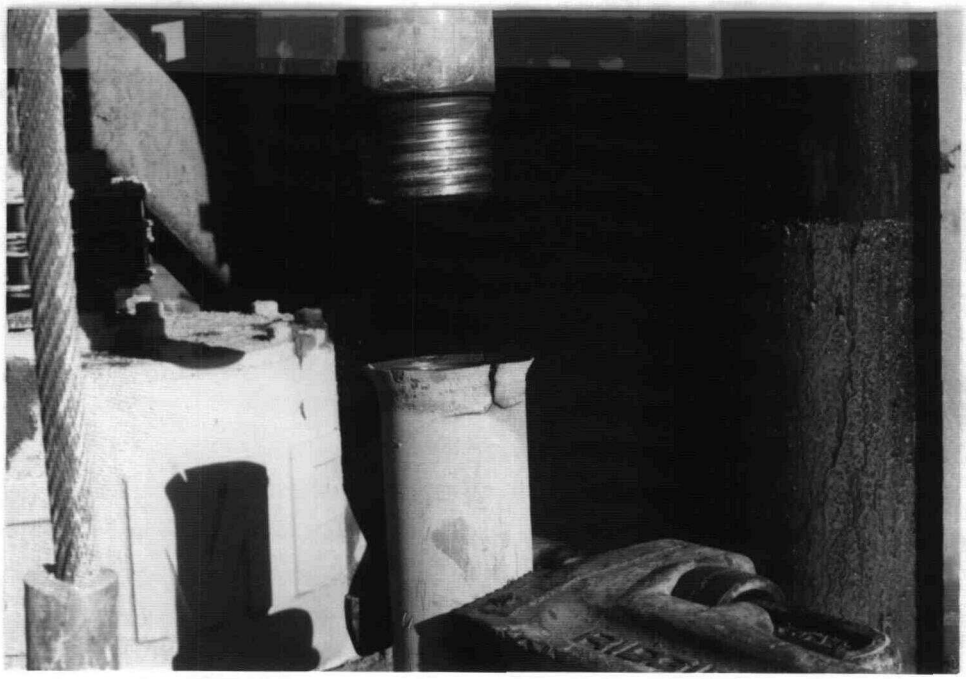


PHOTOGRAPH NO. 4

SITE NAME: Missouri Electric Works

Subject:	Purge water from MW-10.		
Location:	Southeast of MW-10.		
Date:	1/31/91	**Time:**	0839
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 100	**Witness:**	N/A

Direction of Photograph: Northwest



PHOTOGRAPH NO. 5

SITE NAME: Missouri Electric Works

Subject:	Split coupling.		
Location:	Next to drill rig.		
Date:	2/02/91	Time:	0940
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 200	**Witness:**	N/A
Direction of Photograph:	Northeast		

PHOTOGRAPH NO. 6

SITE NAME: Missouri Electric Works

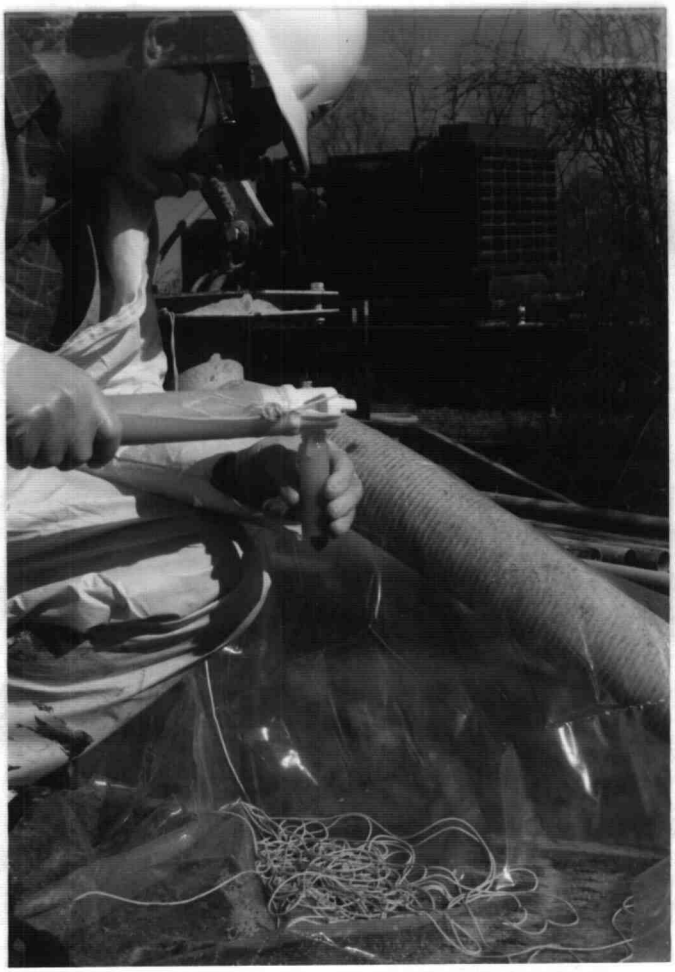
Subject:	Core from 69 to 74 feet.		
Location:	Southeast of drill rig.		
Date:	2/02/91	Time:	1103
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 200	**Witness:**	N/A

Direction of Photograph: North

PHOTOGRAPH NO. 7

SITE NAME: Missouri Electric Works

Subject:	Core sample from 69 to 74 feet (note fractures and staining).		
Location:	Southeast of drill rig.		
Date:	2/02/91	Time:	1103
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 200	**Witness:**	N/A
Direction of Photograph:	North		



PHOTOGRAPH NO. 8

SITE NAME: Missouri Electric Works

Subject:	Teflon bailer being used to collect split sample.		
Location:	South of drill rig.		
Date:	2/03/91	**Time:**	1108
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 200	**Witness:**	N/A

Direction of Photograph: North

PHOTOGRAPH NO. 9

SITE NAME: Missouri Electric Works

Subject:	Picture of mud cavities in limestone.		
Location:	Southeast of drill rig.		
Date:	2/03/91	Time:	0925
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 200	**Witness:**	N/A

Direction of Photograph: North

PHOTOGRAPH NO. 10

SITE NAME: Missouri Electric Works

Subject:	Picture of core from 82 to 87 feet.		
Location:	Southeast of drill rig.		
Date:	2/03/91	**Time:**	1245
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 200	**Witness:**	N/A

Direction of Photograph: South

PHOTOGRAPH NO. 11

SITE NAME: Missouri Electric Works

Subject:	Core samples from 91 to 109 feet.		
Location:	Southeast of drill rig.		
Date:	2/04/91	**Time:**	1526
Photographer:	Todd Trometer	**File No.:**	N/A
Film:	ASA 200	**Witness:**	N/A

Direction of Photograph: Southeast

ATTACHMENT B

PHOTOCOPIES OF DAILY FIELD LOGBOOK PAGES

1-28-91

Oversite and Enforcement Field Notes,
Missouri Valley Electric Work site
Cape Girardeau, Missouri
ARCS Contract No.
JEG Project No. 10-D218-0 WBS:

EPA Region VII, Remedial Proj. MGT (RPM)

ARCS Proj. MGT. STEVEN M. HOUSER
SITE MGT. Terry Hagen
Oversite MGT. Todd Trometer

Scope of work 1 Rig

① Technical oversite
- monitor / Document all field activities
Deviations or ommissions

② Communications
- maintain Phone contact with
the JEG SITE MGT. & EPA(RPM) - Daily

③ Sampling
- collect split samples from PRP

Todd Trometer 1-28-91

1-28-91 — Todd Trometer

The Oversite (om) Manager Todd Trometer

Activities Planned

Set up decon area, decon equipment; & fill water tank

Weather:

Sunny, clear, and cold. Temperature 30-40°F. No precipitation.

Personnel:

Eddie Stanaland	Earth Tech Corp.
David Boylan	Earth Tech Corp.
Jeff Crank	John Mathes & Assoc.
Jim Breeding	John Mathes & Assoc.
Bill Gresham	Jacobs Eng. Group Inc.

Todd Trometer 1-28-91

1-28-91 — Todd Trometer

1420	Arrived on-site at Missouri Electric. Met Bill Gresham on road & followed him to site. Both of us signed in at the front desk. No Earth Tech. people or drillers were present.
1430	Left site to run errands.
1440	Saw drillers on highway proceding to the site.
1520	Met Earth Tech. workers, Eddie Stanaland & David Boyland. drillers.
1530	Drillers from John Mathes & Assoc. are ~~setting up~~ to decon equipment
1606	Drillers from John Mathes & Assoc. are filling up water tank for deconing procedures.
1615	Decon tank has been filled
	Photo 1 Roll #1
1616	ASA 100 E Picture of drums containing contaminated waste & decon pad setup for personnel. Drums are from earilier operations at the site.
1622	Reading over fine details in Health & Safety pl
1637	Posted emergency phone # & directions to nearest

Times continued

1-28-91 Todd Trometer

1645 Drillers deconing equipment before use

1645 Photo 2 Roll #1
ASA 100 E
Drillers deconing eq. before use

1648 Earth Tech workers taking water level measurements from wells on site. Personnel is not properly deconing water level apperatus between each well. No deconing procedure is being followed. *Water level apperatus was not used because wells would not open.

1651 Drillers from John Mathes are not using Nitrile gloves when deconing equipment. Only cloth gloves are being used. This is the initial deconing procedure for the drilling equipment. *Correction, upon further examination both workers are using a rubber type glove. No tyvek are being used in decon procedure.

1709 Drillers have completed deconing equipment.

1716 Decon'ed boot covers before leaving site. Decon setup includes hot soapwater w/ brush & a rinse water. Buckets are in plastic covers. Disposable gloves were put into barrel.

1717 Driller are deconing out. Deconing gloves & boots.

1720 Deconing has been completed. Rinse water was emptied into

1726 Left site.

1-28-91 Todd Trometer

MEW Site File
Break6_000545

Summary:

1918 Prep work was completed today so drilling can begin tomarrow.

1-29-91 Todd Trometer

The oversite manager Todd Trometer

Activities planned:

Start drilling. Get as far as possible. Around 40-45' casing will be put in. This is a couple of feet into bedrock.

Weather:

Morning is foggy, dam, & chilly. Temp 20-30°F. Visibility low. Minor precipitation. Ground is muddy.

Personnel:

Eddie Stanaland	Earth Tech Corp.
David Boylan	Earth Tech Corp.
Jeff Crank	John Mathes & Assoc.
Jim Breeding	John Mathes & Assoc.
Bill Gresham	Jacobs Eng. Group, Inc.

0730 Arrived on site. Earth Tech & Drillers were already at site when Bill & I arrived.

0735 Talked to Eddie Stanaland, he stated that samples will be taken at 80', 160', 120'.

Times continued

1-24-91 — Todd Temple

0750 Met w. th Warren Mueller of Union Electric. He is the Energency Response Coordinator. We simply introduced ourselves & discussed who was going to be on site & what was going to be done today.

0805 Drillers are mobilizing ~~CME~~ CME-95 drill rig.

Near wells 395. Depths are 40-60'. These are where the highest hits of organics occurred. Warren Mueller notified me of this fact.

0811 Drillers are mobilizing drill rig

0818 Photo 3 Roll #1
ASA100 w
Picture of hollow stem auger before operation

0821 Bill Grisham notified me after talking to the drillers that the hollow stem augers has an 8" outer diameter & a 4 1/4" inner diameter.

0824 Drilling has started. Drill cuttings are being shoveled aside for the time being.

0831 Soil is a silty clay, orangish brown in appearance. Firm soil, CL under the unified system.

Times continued

1-29-91 — Break6_000546 — Todd Temple

0837 Drillers at 30'. Felt like weathered bedrock was hit between 25-30'

0842 30', weathered ~~solid~~ bedrock has been struck. only about 2 ft. thick. Then soft layer. ~~for about 2ft.~~ Pieces of gravel are in samples. This may be the obstical the drillers encountered.

0853 Drillers at 44'.

0859 Drillers are going to spread drill cuttings on site.

0900 Soil sample are wetter than before. Probly entering the vadose zone.

0905 Drillers at 59'. One can hear the water coming up the center plug. Artesian characteristic.

0920 Photo 4 Roll #1
ASA100 w
Picture of drill cuttings at 59'. Highly plastic.

0921 Bedrock encountered at 60'.

0941 TYPE 1 Portland cement is being used for grout mixture. The drillers are going to pour the grout down the inside of the auger & then pull out the hollow stem augers to keep the hole open. Nutragel, bentonite, is

Time	1-30-91 — Todd Comeaux
	Personnel:
	Bill Gresham (geologist) Jacobs Eng. Group Inc.
	David Boylan (hydrogeologist) Earth Tech
	Eddie Stanaland (Geologist) Earth Tech
	Jeff Crank (drill helper) John Mathes & Assoc
	Jim Breeding (driller) John Mathes & Assoc
	Jim Fels (Geologist) MDNR
	Kurt Hollman (Geologist) MDNR
	Warren Mueller (Emergency Response Coordinator) Union Electric
	Stephanie Doland Jacobs Eng.
0730	Bill Gresham arrived onsite. Earth tech personnel were already onsite. John Mathes drillers arrived just before Bill.
0750	Warren Mueller arrives onsite.
0800	Oversite manager arrives on site.
0813	John Mathes drillers are filling up water tank to prepare for drilling operations.
0815	Earth Tech people are preparing decon station.
0831	Warren Mueller confirmed that the drillers are going to continuously core to 180'. Core samples will be left onsite until Saturday. Samples will be taken at fracture zones, or areas of increased transmissivity.

Time continued	1-30-91 — Todd Comeaux
0833	Drillers are redeconing equipment.
0856	Photo 8 Roll #1 ASA100 N Driller Deconing equipment before proceeding with air coring.
0916	Drillers finishing up deconing equipment & are loading equipment on trailer
0930	MDNR representatives arrive onsite.
0950	Drillers have finished deconing & loading up equipment
1005	Drillers finishing setting up over drill location.
1043	Photo 9 Roll #1 ASA100 NE Picture of drill bit. (Tri-Cone bit)
1043	Photo 10 Roll #1 ASA100 NE Picture of drill bit
1100	Photo 11 Roll #1 ASA100 S VAN AIR "CX" series coalesging filter used to remove hydrocarbons & volatiles from compressed air stream

MEW Site File
Break6_000547

Times always

1-30-91 — Field Time

1112 Drillers are punching through grout barrier at 59'-60'.

1122 Photo 12 Roll #1
HSA100 N
Teflon bailers left exposed & touching steel barrier. possible point for cross-contamination

132 Air compressor used is a Atlas Copco, 100 P.S.I. 350 CFM

1143 Photo 13 Roll #1
HSA100 N
Picture of teflon bailers (Cross-contamination)

1150 Work is slow due to weather conditions. The wind chill is very cold. Some of the clasps on the hoses had to be unfrozen. Driller are drilling through grout layer & preparing equipment for air coring operation after lunch.

1206 All worker are breaking for lunch.

1300 Arrived back onsite. Drillers were already onsite.

1330 Earth Tech workers are going out to drill site. Earth Tech personnel brought bailers & equipment back from drill site to

Times Continued 1-30-91

continued their Van. They carried equipment back to drill site after site.
- Drillers are wearing polytek, hard hat, safety glasses, & rubber boot & gloves.
- Earth Tech personnel is wearing hardhats, polytek, rubber boots, safety glasses
- State representatives, MONR, are wearing hard hat, Rubber boots,

1402 Jim Breeding's wife & son showed up onsite. She park at the edge of the exclusion zone

1405 Air coring started around 1400.

1410 Photo 14 Roll #1
HSA100 NW
Picture of air coring at work.

1418 Jim Breeding went to meet wife & son outside of exclusion zone
- Notified Eddie Staniard that no other personnel should be on site. He notified Jim of this fact.

1430 Wife & son leave but drop of equipment of drilling. They did not get out of car or need to bring down supplies

1441 Photo 15 Roll #1
HSA100 SW
Inner barrel to core.

1443 Drillers are at 64', started at 61'.

Times continued — 1-30-91 — Todd Lemke

1446 David Boylan move ty Clan bailers with the cloth gloves he has been wearing. Bailers are still left exposed. (Cross-Contamination)

1454 Photo 16 Roll #1
ASA100 NW
Core from 61-~~65~~ 64'. Broken fragments were recovered. Jim Fels of MDNR, a state geologist states that is might be the Blattin limestone, ordovician in age. That is what the geologic map states. Sample is brownish-~~black~~ grey. Sample is broken up probably due to the surface being weathered or highly fractured. Also is probably thinly bedded.
- Sample shows fractures, possibly filled with calcite.

1533 Took a Knife & cut into one of the veins filling in the fractures. Vein was soft & showed crystal forms. Most likely calcite

1552 David Boylan of Earth Tech is going to purge the well 788.

1606 Buddy system is not being observed while David Boylan of Earth Tech is purging wells 788.

1608 Oversized subsurface bit is being

Times continued — 1-30-91 — Todd Lemke

continued used for air coring.

1623 Photo 17 & 18 Roll #1
ASA100 NE
Pictures of drilling & equipment setup at well site.

1627 Photo 19 Roll #1
ASA100 E
Picture of broken ground & well casing

1630 Second sample from 64-69' has been completed. Sample is white & gray, thinly bedded, chalky outer coating, chalky appearance is probably due to drill cuttings.

1645 MDNR representatives left site.

1650 Talked to Terry Hagen of Jacobs Eng. & confirmed progress & what was going to be done tomorrow.

1730 Left site, Mathes drillers followed Earth Tech people were decoming bailers. They were using a hot soap water bath & a rinse water along with DI water.

Summary:

1931 Drilling has been slowed down because Mathes air compressor is not cleaning out the drill hole. Mathes is having a new, larger compressor sent down from St. Louis today. Day was cold which also slowed down the operation.

1-31-91 Todd Trometer

oversite manager Todd Trometer

Activities planned

Earth Tech personnel is going to finish purging wells on the onsite shallow wells. John Mathes personnel are locating a new air compressor. Once found, they will continue air coring.

Weather:

Sunny, cold. Temp is in 20's°F. High temp for today is going to be 42°F. No precipitation. Frost on the ground.

Personnel:

Eddie Stanaland	Earth Tech
David Boylan	Earth Tech
Terry West	PRP Reps
Jim Breeding	John Mathes & Assoc
Jeff Crank	John Mathes & Assoc
Jim Fels	MDNR
Kurt Hollman	MDNR
Chuck Harris	John Mathes & Assoc.

0731 Arrived onsite. Earth tech personnel were already onsite. Drillers were not present.

0738 Talked with Eddie Stanaland of Earth Tech. He stated that they are going to finish purging wells & that the drillers are looking for an air compressor.

Times Continued 1-31-91 Todd Trometer

MEW Site File
Break6_000550

0813 Photo 20 Roll #1
ASA 100 W
Picture of David Boylan of Earth Tech purging well. Purge water has a lot of suspended particles in it. The water has a milky brown appearance to it. This appearance is due to the residium in which the screen is setin.

0815 David Boylan of Earth Tech states that pH & conductivity parameters will be take on some of the wells being purged.

0820 Purge water is being dumped on site. Plastic has been lain around well to avoid cross-contamination. The amount of purge water taken out of each well is being measured by a 5-gallon bucket.

0827 Teflon bailer is being used for the purging of all wells.

0839 Photo 21 Roll #1
ASA 100 NW
Picture of purge water in teflon bailer.

0840 David Boylan took the temperature of the water at well 10. Temperature was 12.5°C.

0841 Eddie Stanaland left site at 0825 to run & get supplies.

Times Continued 1-31-91 Todd Tometo

0906 Eddie Stanaland returns onsite.

0911 Left to get film.

0926 Returned back onsite. Drillers were already onsite. They are meeting with Eddie Stanaland of Earth Tech. Terry West, Representative for PRP, was onsite.

0930 ~~Photo 22~~ ~~ASA100~~ No picture
~~Picture of well ID~~

0931 David Boylan of Earth Tech is purging well #4 Temperature of H_2O is 11°C. Water is clearer at this well but there is still suspended clay particles from the residuum in the water.

0934 Photo 23 Roll #1
ASA100 NW
Picture of purge water at well #4.

0945 Met with Terry West & discussed project. He is examing the core sample. He discussed what the PRP's are trying to do at the site.

0956 Terry West is taking pictures of the drill rig onsite. He is wearing no protective clothing.

Times Continued 1-31-91 Todd Tometo

1001 Photo 23 Roll #1
ASA100 W
Picture of Eddie Stanaland taking VOA samples with bottom emptying device & teflon bailers.

1004 Drillers arrive onsite.

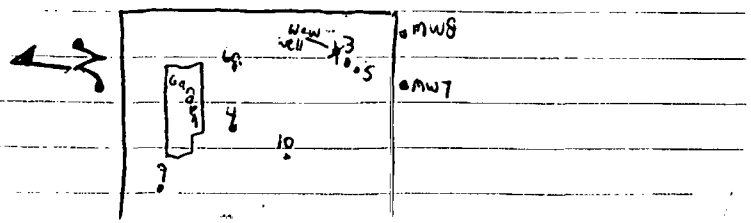
1010 Eddie Stanaland & David Boylan were tapping VOA ~~vials~~ Vials to insure there were no air bubbles. Drillers show up onsite.

1025 Earth Tech personnel leave site. Terry West is a professor at Purdue university & is a consultant for ~~some~~ 10 of the smaller PRPs at the site.

1030 VOA samples were put in coolers. Both Eddie & David were wearing surgical gloves when taking the samples.

1115 Earth Tech personnel ~~came~~ went back onsite. I was notified that they went to sample the 2 offsite well & purge them.

1130 Received map of well locations. Here is a schematic of these locations.



Times Continued 1-31-91 — Label Transcribe

1140 Photo 24 Roll #1
ASA100 N
Picture of bailer wire touching wells metal casing while purging well #9.

1155 Drillers are leaving site. Earth Tech personnel are still purging well #9. They have been decontaminating the teflon bailers in between each well.

1245 Left site for lunch.

1345 Returned from lunch. Earth Tech people & Drillers were already onsite.

Photo 1 Roll #2
1353 No Picture

1357 Terry West arrives back onsite.

1400 Eddie Staveland ~~stated~~ that the Mathes crew is still going to try & use the old compressor. They might put a 4" I.D. casing inside the well casing already put in to make the air coring work better.

1423 All plastic put around wells for purging has been put in contaminated waste barrel.

Times Continued 1-31-91 — Label Transcribe

1425 Drillers welded more bits on their bit so that the bit will fit other casing better. Hopefully this will allow the well to be blown out better. The drillers are currently going back down the well to test the new bit.

1427 Some fast food wrappers & a coke are laying on the ground by the site.

1430 All VOA vitels are labeled & the labels are taped.

1438 MYRON L company pH/conductance meter is being used for pH/conductance/temp. ~~Terry just left drill site~~

1442 Photo 2 Roll #2
ASA200 S
Picture of drainage path for water on site. Path leads down hill to the south. South central part of site.

1444 Photo 3 & 4 Roll #2
ASA200 N
Pictures of transformers stored onsite in back.

1500 Photo 5 Roll #2
ASA200 N
MW-7

Times Continued 1-31-91 — Todd Trimble

1501 Photo 6 Roll #2
ASA 200 E
mw-8

1504 Photo 7 Roll #2
ASA 200 N
Picture of PCB warning sign of southside of Missouri Electrics boundry

Photo 8 Roll #2
1507 ASA 200 NE
Picture abondoned well at the SW corner of site.

1509 Photo 9 Roll #2
ASA 200 NE
mw-10

1511 Photo 10 Roll #2
ASA 200 NE
mw-4

1513 Photo 11 Roll #2
ASA 200 N
mw-9

1514 Photo 12 Roll #2
ASA 200 N
old abondoned well at NW corner of site.

Times Continues 1-31-90 — Todd Trimble

1515 Photo 13 Roll #2
ASA 200 N
Drainage path onsite & NW corner

1516 Photo 14 Roll #2
ASA 200 SE
Transformers stored in back.

1518 Photo's 15 & 16 Roll #2
ASA 200 W
Photos of large transformers directly in back of Missouri Electric building

1533 Photo 17 Roll #2
ASA 200 E
mw-6a

1534 Photo 18 Roll #2
ASA 200 E
mw-6 (old)

1538

well #	Purge Vol (gallons)	pH (standard units)	Conductance (millisiemen/cm)	Temp (C°)
1				
2	-16			
3	11	7.05 / 6.92 / 6.85	4.66 / 4.59 / 4.65	12 / 12 / 12
4	9.8	7.46 / 7.28 / 7.15	3.61 / 1.80 / 1.91	11 / 12 / 12
5	2.8	7.24 / 7.01 / 6.96	1.94 / 2.16 / 2.13	12 / 13 / 13
6	[illegible]			
8	[illegible]		3.21	12
7	8.3 / 4.5	7.20 / 7.23	2.86	12
9	8	7.95 / 7.90	2.16 / 1.28	12 / 13
10	12	7.63	2.19 / 3.89	13 / 10

Times Continued 1-31-90 — Todd Trometer

1547 Chartinfo. Conductance was taken on X20 scale. 3 different measurements were take for some of the well locations. MW-3 5 events were taken but only 3 were recorded in my log book. X20 scale makes value 20 times lower thus 8.00ppm = 1600 ppb

1554 Drillers are wearing Polyvek, hardhat, saftey glass & rubber boots & gloves.

1602 Photo 19 Roll #2
ASA 200 E
Picture of cracked casing at MW-3

1604 Drillers start to core again.

1615 Pressure is build up in hole & cannot escape thus turning of pressure system

1617 Person from John Mathes showes up with no more equipment. (Chuck Harris)

1642 Mathes worker deconning 4" I.D. casing that they are going to put down well. They are doing this to seal of well so they do not lose all of their air. They are going to drive down casing with a 300 lb hammer.

1733 Earth Tech personnel left to FedEX samples collected from shallow wells VOA vials

Times Continued 1-31-91 — Todd Trometer

Continued were labeled & taped & put into freezer bags. PCB samples were taped & labeled & put into cooler with VOA's. Cooler contained ice.

1737 Drillers are putting in 4" I.D. casing in well so they are ready to go first thing in the morning

1741 Cat runs across gravel area where transformers are located

1758 Finished putting casing down hole.

1805 Leaving site. Drillers are picking up & then leaving. Eddie Staveland is overseeing drillers.

Summary

1905 Drillers are having problems with their air pressure. They are lossing air pressure in the formation. They are going to drive a 4" I.D casing into the formation with a 300' hammer to hopefully aliviate this problem. They are ready to drive casing in with hammer 1st thing tomorrow morning

2-1-91 — Todd Trometer
oversite manager
Todd Trometer 2-1-91

Times

2-1-91 — Todd Trometer

Activities planned:

Hammer casing into the formation & continue coring.

Weather:

Sunny, moderate temp in morning 25°F. Temp will be 50-60°F today. No precipitation clear skies.

Personnel:

Eddie Stanoland	Earth Tech
David Boylan	Earth Tech
Chuck Harris (driller)	John Mathes & Assoc.
Jim Breeding	John Mathes & Assoc.
Jeff Crank	~~MDNR~~ John Mathes & Assoc
Jim Fels	MDNR
Kurt Hollman	MDNR
~~Kurt~~	

0733 Arrived on site. Earth Tech personnel were already onsite. They were constructing the Decon pad. Chuck Harris was also onsite.

0808 Eddie Stanoland leaves site to run errands.

0818 Drillers are trying to drive casing into formation

0830 Casing set into rock

0835 Eddie Stanoland returns to site

Times Continued 1-31-91 — Todd Trometer

0915 Casing is setted in bedrock very well. Having problems bringing casing back up to put on seal plate. Mathes is going to use drill rig to bring casing up.

0925 Jim Fels & Kurt Hollman came on site. Left site at 0940 because no coring was being completed.

1050 Drillers finished cleaning out hole & sealing hole. Drillers had to bring casing back up because there was to much stick up to work around. Brought it back up & put on a shorter pipe. Now they are ready to start coring again. It seems as if a good seal has been formed & the hole is clearing out well.

1101 Photo 20 Roll #2
ASA200 E
Picture of drillers working onsite.

1106 Photo 21 Roll #2
ASA200 NE
Picture of drill bit rigged up to ream out hole

1158 Drillers are adding a little steam from the steam cleaner into the filter. By adding this to the air it will allow the

1200 ~~Steam~~ Cleaner/air compressor blew a gasket

1205 Left for lunch

1315 Came back onsite. Drillers were onsite.

1446 Drillers are done for the day. Compressor broke down. Drillers are bringing a new compressor from St. Louis late today. Drilling will start first thing tomorrow morning. Drillers & going to decon hoses & compressor & decon out.

1451 Photo 22 Roll #2
ASA200 NE
Picture of deconing compressor that is broken

1503 Driller deconing compressor is wearing tyvek, surgical gloves & rubber boots

1507 Earth Tech Personnel are going to get supplies for tomorrow

1515 Driller is deconing tools off. Finished with the compressor

Photo 23 ASA 200 NE Roll #2
1518 Driller deconing truck.

1541 Tyvek is laying by drill rig down at the drillsite

Times Continued 2-1-91 Todd Trometer

1623 Drillers are putting down some absorbing material down around the drill site to dry up the wet spots

1637 ~~Dr~~ Drillers & Earth ~~Earth~~ Tech personnel leaving site. I am leaving site also.

1917 Summary

* New air compressor is going to be here today. The air compressor is a larger one. The hole should be ready to air core first thing in the morning.

2-2-91 Todd Trometer
Todd Trometer
onsite manager

Activities:

Begin to air core when new air compressor arrives onsite. Take split samples if air coring goes well. Take pictures & describe core samples.

Weather

Sunny, 30°F. Temperature is going to be in the 60's F. No precipitation & little wind.

Personnel:

Jim Broeding	John Mathes & Assoc
Jeff Crank	John Mathes & Assoc
Eddie Staneland	Earth Tech
David Boyland	Earth Tech

Time Continues 2-2-91 — Todd Curtis

continued Personnel:

Kent Schaffer — John Mathes & Assoc.

0731 Arrived on site. Earth Tech personnel was already onsite

0740 Drillers arrive onsite. They proceed to fill up their water tank.

0833 Air compressor arrives onsite.

0843 Photo 24 Roll #2
ASA 200 NW
Picture of new compressor going to be used. It is a high pressure SCHRAMM 850/350 air compressor. Eddie Stoneland left site.

0852 Drillers are backin new compressor at drill site. Drillers are wearing rubber boots.

0901 Air compressor is on a flat bed. Truck pulling air compressor contains 55-gallon barrels on it

0919 Drillers are putting on Tyvek & preparing to drill.

Photo 1 Roll #3
0925 ASA 200 E
Picture of drill site after new air compressor

Times Continued 2-2-91 — Todd Curtis

0930 Air coring started at 0923.

MEW Site File
Break6_000557

0933 Photo 2 Roll #3
ASA 200 NE
Picture of hose connected to well. Directs what is being blown out of well.

0937 Air pressure broke top of rod. Split the top of the pipe. Sub broke. Sub connect & drills stem & rotary part of rig.

0940 Putting on new sub.

9940 Photo 3 Roll #3
ASA 200 NE
Picture of split sub.

0944 Problems occurred at 72'.

0948 Putting on new sub.

0956 Started air coring once again.

1040 Photo 4 Roll #3
ASA 200 NE
Picture of drillbit & connectors on plastic. Helps prevent cross contamination.

1041 Pulling out core sample

Todd Curtis 2-2-91

Time Continued 2-2-91 — Todd Powers

1051 Photo 5 & 6 Roll #3 ASA200 NW
Picture of core catcher

1056 Photo 7 Roll #3
ASA200 N
Picture of core bit, keeps core in pipe also.

1103 Photo 8 Roll #3
ASA200 N
Picture of staining on core sample

1103 Photo 9 Roll #3
ASA200 N
Picture of core from 69-74' getting pretty good recovery now. Sample is limestone/Dolomite, fine-grained with fractures & Festains, color is brown-gray. Some of the fractures are filled in. Core sample is being handled with surgical gloves.

1105 Drillers are starting to air core again. It seems like the air coring is going more smoothly now. Eddie Standard of Earth Tech went to call his boss. He left site.

1143 Had to stop for a couple of minutes because engine was getting hot.

Todd Powers 2-2-91

Time Continued 2-2-91 — Todd Powers

1146 Photo 10 Roll #3
ASA200 NE
Picture of 300lb hammer used to drive down 4" ID casing into well.

1221 Left site for lunch

1301 Returned to site. Drillers & Earth Tech personnel were already onsite

1356 ~~Air coring dr~~ Drillers blew another coupling. They are going to try & locate another one ~~They~~ are leaving site to do so.

1457 Started coring with welded sub.

1510 Pulled core barrel from 79'.

1530 Started coring

1540 Sub breaks.

1545 Drillers pull drill stem & trip out of hole.

1610 Earth Tech personnel measured water level through casing. Level read 60.65' from TOC. TOC is 3'.

1715 Everyone left site.

Todd Powers 2-2-91

MEW Site File
Break6_000558

2-3-91 Todd Trometer

oversite manager Todd Trometer

Activities Planned

Continue air coring & take split samples

Weather:

Sunny. cold in the morning, frost on the ground. No precip. Afternoon, temp in 60°F & sunny.

0735 Arrived onsite. Earth Tech personnel & drillers were already onsite

0745 Warren Mueller arrives onsite.

0805 Water level measurement was take in new well. Depth from TOC was 39.60 ft. 3ft stickup on casing.

0817 Drillers are flushing out well

0820 Starting to air core. Coring is going very well. Drillers are still just using air in pressure line. Drillers are going to core in 10 ft sections instead of 5' sections after this initial 5' section.

0840 Eddie Standard of Earth Tech is preparing teflon bailers for sampling. He deconed the bailer bat carried them back with cloth gloves.

0903 Photo 11 Roll #3

ASA 200 NW

Picture of broken sub. coupling

0905 Drillers are taking off broken coupling

Personnel on site

Jim Breeding	Mathes
Jeff Crank	Mathes
Eddie Standaland	Earth Tech
David Boylan	Earth Tech
Warren Mueller	Union Electric

0907 Coupling broke at 81'. Drillers are going to pull up this core sample & start using water with air to alleviate some of the pressure/friction on the sub. Drillers are also going to fill up water tank.

0925 Photo 12 Roll #3

ASA 200 N

Picture of solution cavities in core sample. Pressure solution cavities are secondary.

0930 Core is from 77½-81'. Still seems to be the Plattin limestone. Sample has solution cavities filled with lime/carbonate mud. There are fractures in the core which are also filled in with lime/carbonate mud. There may also be possible articulate brachiopods in the

2-3-91 Todd Lombardo

continued core sample but it is difficult to tell. Color is gray to dark gray. Solution cavities are brownish in color. Cavities fill with lime/mud. Looks a lot like clay or mud stone. Core is saturated with water.

1000 Earth Tech personnel are measuring the depth of the hole. Hole is at 81'. Water level is at 69' after it has equilibrated.

1013 Earth Tech personnel are purging 11 gal. out of new well. They figured 3 bore volumes are going to be taken out of a 2" diameter well from 60-81'.

1043 Earth Tech personnel are purging well. Purge rope is touching the ground.

1043 Photo 13 Roll #3
ASA 200 N
Picture of purge water from new well. Water appears milky brown.

1107 Taking split sample. Earth Tech Personnel took their samples & are also going to take a water sample of the water tank being used for drilling. Earth Tech personnel are not using bottom emptying device.

Todd Lombardo 2-3-91

2-3-91 Todd Lombardo

MEW Site File
Break6_000560

1108 Photo 14 Roll #3
ASA 200 N
Picture of sample being taken.

1113 Split samples were placed in iced cooler immediately after sampling ~~split samples for VOAs~~ sampling. Split samples for VOAs were taken after Earth Tech samples were taken. PCB split samples were taken along with Earth Tech's samples. They filled up one of their samples then I had them fill up my 80 oz. amber bottle with one bailed volume. We continued alternating this process until all samples were filled. These samples were taken without the use of water.

1120 Warren Mueller is leaving site for a couple of days.

1134 Drillers are putting on a new sub.

1141 Eddie Stonaland of Earth Tech is deconing teflon bailers.

1151 Photo 15 Roll #3
ASA 200 SW
Picture of water sample being taken. Water sample is from tank being used for drilling. ~~This is the second different~~

Times Continued 2-3-91 Todd Crowder

Continued APR laboratory out of Houston is where Earth Tech is sending their samples

1157 Drillers started air coring with water

1202 Void space was struck between 81.5 & 82.5 feet. David Boylan of Earth Tech is taking water samples back to van to be put into a iced cooler

1205 Water coming out of hole is muddy. Void space was probably mud.

1211 Coring is going pretty well now. It took 5 min. to go 1 foot.

1228 Drillers are getting their water from MEW. Drillers just finished coring 6 feet. Drillers are at 87 feet. Drillers are pulling out 6 foot core

1245 Photo16 Roll #3
ASA 200 S
Picture of possible soft sediment deformation or ~~shat~~ Staurolites SP?

1246 Sample is mostly core Very good return. Some brown patches of lime/carbonate mud is in limestone sample. Limestone is a brown-gray Some nitrite nodules are in sample

Times Continued 2-3-91 Todd Crowder

1315 Left for lunch

1400 Arrived back on site for lunch

1411 Drillers arrived onsite.

1422 Drillers filled up other water tank. Filled up water tank at Union Electric municiple water supply. Now a water sample of this water is going to be taken because 2 different water supplies are being used.

1430 Photo17 Roll #3
ASA 200 N
Picture of water tank with Union Electric water in it.

1431 David Boylan of Earth Tech is taking water sample of water from Union Electric

1510 Drillers are pulling out 5 foot core section. Core is from 87-92'

1522 Examing the core sample. Almost 100% recovery Core definately contains articulate brachs. They are quite abundant in this sample. Solution cavities seem to have disappeared. Rock core still contains abundant fractures. Cores contain some type of vein pattern, ~~and~~ doesn't appeared to be caused by pressure solution. Looks like staining. This sample is a fossiliferous

Things Continued 2-3-91 — Todd Trometer

continued limestone, gray brown in color. At the separation points of some of the core samples appear to be a solution type texture.

1618 Drillers finished coring 5 more feet. They are at 97'. Drillers are putting on another rod & are going to go 5 more feet and will have a 10 foot core sample.

1633 Drill was shut down because the transmission on the drill rig is getting hot. Stopped at around 98 feet.

1658 Drillers pulled out core barrel. Core is from 92-97'. 7 ft. of core. Seem to have close to 7 ft recovery. Sample still is fossiliferous, containing fractures filled with calcite. Color is grown-gray.

1717 Starting to air core again.

1739 Stopped drilling because transmission was hot again. Stopped at 100 ft.

1740 Left site.

Todd Trometer 2-3-91

2-4-91 — Todd Trometer

oversite manager

Activities planned

Continue air coring & obtain samples between 120-130.

Weather

Sunny, partly cloudy, warm

Personnel

Kent Schauffer	Mathes
Jim Breeding	Mathes
Jeff Crank	Mathes
Eddie Stoneland	Earth Tech
David Baylon	Earth Tech

0737 Arrived onsite. Earth Tech & Drillers were already onsite

0742 Starting air coring

0820 Water tank arrives onsite after filling up with water at Union Electric municiple water supply.

0849 Drillers at 106 ft.

0856 Photo 18 Roll #3
ASA 200 NE
Picture of MW-3 & MW-5. MW-5 is the well on the [redacted] right.

Times Continued 2-4-91 — Todd Thometz

0912 Drillers are pulling core from 107 ft. Core is from 99 ft. to 107 ft.

0926 Core description: The sedimentary structure that earlier were thought to be soft sediment deformation now upon futher observation most likely is a fracture pattern filled in by a dark material. Sample still contains abundant fracture, some of which are filled in with calcite. No apparent fossils, possibly some chert nodules. Color is a brown-gray.

0930 Driller goes to fill up water tank

0951 Left site to call Terry Hagen

1000 Talked to Terry Hagen of Jacobs Eng & notified him progress.

1010 Arrived back onsite.

1020 Eddie Stonaland of Earth Tech notified me that the core barrel is stack & the drillers have to trip out of hole in order to get at the problem.

1103 After tripping out of hole the drillers found out that their main rod split at the female joint. There will be a couple of hours down

Times Continued 2-4-91 — Todd Thometz

1126 Specific conductance meter is a Myron L.

1215 Driller is decening out to get parts & lunch

1335 Testing packer & it blew a hole in the membrane.

1524 Photo 19 Roll #3
ASA200 SE
Picture of drainage path along the south side of the site.

1526 Photo 20 Roll #3
ASA200 SE
Picture of core sample

1615 Left site to go & leave supplies at hotel for Terry Hagen of Jacobs Eng. Group

Todd Thometz 2-4-91

Paul Kiel

Friday, March 1, 1991

0630 - JEG representative Paul Kieler contacted Earth Tech's site manager David Boylan in Rm 211 at the Holiday Inn in Cape Girardeau in reference for the sampling event for well MW-11. Boylan stated that the lab had sent the wrong type of sample containers on Thursday, Feb. 28th. He would contact the Federal Express Office at 0800 to check and see if the sample containers had arrived.

0850 - JEG representative and David Boylan leave hotel for Federal Express office in Cape Girardeau. Boylan mailed Earth Tech field instruments and picked up proper sample containers.

0930 - arrive on site MEW. Weather: cold lower 30°s F Windy NW, 15-20 mph and heavy rain
David Boylan checks out John Matthes drilling rig (on stand-by) and signs crews' timesheets

0955 Matthes rig departs site for the day.

Activities include collecting split samples for the newly constructed well MW-11. MW-11 was drilled to a depth of ~122' and was developed and/purged on Thursday Feb. 28th.

1000 - Earth Tech will be sampling for PCB's, VOA's, chlorinated hydrocarbons, TDS, and major cations and anions at MW-11 and major cations and anions along with TDS at MW-3.

CONTINUED

Friday March 1, 1991

1013 JEG rep. and Earth Tech. Boylan sample well MW-11 for VOA. KIELER obtains EPA split sample ~~#1 CSR~~ PK#1 CS26R-001 for VOA sealing with custody tape and placing samples in cooler with ice preservative.

1017 - JEG rep. and Earth Tech's Boylan sample well MW-11 for PCBs. KIELER obtains split sample #1 CS26R-001 for PCB with custody seals and placing in cooler with ice preservative. Boylan collects chlorinated hydrocarbon sample at 1020.

(1020)

1027 - Boylan collects TDS, major cations and anions from well MW-3 while MW-11 allowed to recover for anion/cation and TDS sample collection.

1040 - Boylan collects cation/anions sample along with TDS sample from MW-11.

1050 - Boylan inspects site and break downs boot wash station while JEG rep. finishes paper work out of rain.

1105 - JEG rep. and Earth Tech's Boylan depart site.

1120 - JEG departs for Lenexa.

Paul F. Kiel 3/1/91